PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of	Docket No: Q79460
Henning SIRRINGHAUS, et al.	
Appln. No.: 10/758,256	Group Art Unit: 1794
Confirmation No.: 5709	Examiner: Leszek B KILIMAN
Filed: January 16, 2004	

For: ALIGNED POLYMERS FOR AN ORGANIC TFT

SUBMISSION OF APPEAL BRIEF

MAIL STOP APPEAL BRIEF - PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Submitted herewith please find an Appeal Brief. The USPTO is directed and authorized to charge the statutory fee of $540.00 and all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

/ Christopher J. Bezak /

Christopher J. Bezak
Registration No. 63,241

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE
23373
CUSTOMER NUMBER

Date: August 11, 2010

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of	Docket No: Q79460
Henning SIRRINGHAUS, et al.	
Appln. No.: 10/758,256	Group Art Unit: 1794
Confirmation No.: 5709	Examiner: Leszek B KILIMAN
Filed: January 16, 2004	

For: ALIGNED POLYMERS FOR AN ORGANIC TFT

APPEAL BRIEF UNDER 37 C.F.R. § 41.37

MAIL STOP APPEAL BRIEF - PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In accordance with the provisions of 37 C.F.R. § 41.37, Appellant submits the following:

Table of Contents

I. REAL PARTY IN INTEREST

The real party in interest is Cambridge University Technical Services, Ltd. The Assignment was previously submitted in parent U.S. Application No. 10/018,425 (now U.S. Patent 6,723,394) and recorded in the U.S. Patent and Trademark Office at Reel 020109, Frame 0089.

II. RELATED APPEALS AND INTERFERENCES

Upon information and belief, there are no other prior or pending appeals, interferences, or judicial proceedings known to Appellant, Appellant's representatives, or the Assignee that may be related to, be directly affected by, or have a bearing on the Board's decision in this Appeal.

III. STATUS OF CLAIMS

Claims 1-28 are all the claims pending in the application. Claims 1-28 (*see* Claims Appendix) stand finally rejected and are the basis for this Appeal.

IV. STATUS OF AMENDMENTS

All amendments and arguments are believed to have been previously entered and made of record.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

The present application relates to aligned polymers, especially aligned polymers suitable for use in devices such as polymer thin film transistors, and methods of aligning polymers. The aligned polymers are preferably substantially parallel aligned, liquid-crystalline conjugated polymers (*see* Filed Specification, p. 1, ll. 7-10, Published Specification, ¶ 2).

Independent Claim 1

A method for forming an electronic device having a semiconducting active layer comprising a disc-shaped molecular material, the method comprising aligning columns of the disc-shaped molecules parallel to each other by bringing the disc-shaped molecular material into a liquid crystalline discotic phase (*see* Filed Specification, p. 18, ll. 18-28, Published Specification, ¶ 77).

Independent Claim 19

An electronic device having a semiconducting active layer comprising a disc-shaped molecular material in which columns of disc-shaped molecules have been aligned parallel to each other by bringing the disc-shaped molecular material into a liquid-crystalline phase (*see* Filed Specification, p. 18, ll. 18-28, Published Specification, ¶ 77).

Independent Claim 26

A method for forming an electronic device having a semiconducting active layer comprising a disc-shaped molecular material, the method comprising aligning columns of the disc-shaped molecules within domains by bringing the disc-shaped molecular material into a liquid-crystalline phase (*see* Filed Specification, p. 18, ll. 18-28, Published Specification, ¶ 77).

Independent Claim 27

A method for forming an electronic device having a semiconducting active layer comprising a disc-shaped molecular material, the method comprising aligning columns of the disc-shaped molecules as a monodomain oriented in a preferred uniaxial direction within the layer of the electronic device by bringing the disc-shaped molecular material into a liquid-crystalline phase (*see* Filed Specification, p. 18, ll. 18-28, Published Specification, ¶ 77).

Independent Claim 28

A transistor device comprising a disc-shaped molecular material having a discotic liquid crystalline phase (*see* Filed Specification, p. 18, ll. 18-28, Published Specification, ¶ 77).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. Whether claims 1-28 are improperly rejected on the grounds of non-statutory obviousness-type double patenting over claims 1-49 of U.S. Patent No. 6,723,394.

VII. ARGUMENT

Appellant respectfully requests the Board to reverse the final rejection of the claims pending in the application for at least the following reasons.

Claims 1-28 are rejected on the grounds of non-statutory obviousness-type double patenting over claims 1-49 of U.S. Patent No. 6,723,394 (hereinafter "U.S. '394"). Appellant respectfully submits that these grounds of rejection are legally and technically inaccurate, and are in error, as explained by the following remarks.

A. Legal Standard

The Examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness (*see* MPEP § 2142).

More specifically, "A double patenting rejection of the obviousness-type, if not based on an anticipation rationale, is "analogous to [a failure to meet] the nonobviousness requirement of 35 U.S.C. 103" except that the patent principally underlying the double patenting rejection is not considered prior art. *In re Braithwaite*, 379 F.2d 594, 154 USPQ 29 (CCPA 1967). Therefore, the analysis employed in an obviousness-type double patenting rejection parallels the guidelines for analysis of a 35 U.S.C. 103 obviousness determination. *In re Braat*, 937 F.2d 589, 19 USPQ2d 1289 (Fed. Cir. 1991); In re Longi, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985)" (*see* MPEP § 804).

Further, "Since the analysis employed in an obviousness-type double patenting determination parallels the guidelines for a 35 U.S.C. 103(a) rejection, the factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103 are employed when making an obvious-type double patenting analysis" (*see Id.*).

Still further, "[i]f the application at issue is the later filed application or both are filed on the same day, only a one-way determination of obviousness is needed in resolving the issue of double patenting, *i.e.*, whether the invention defined in a claim in the application would have been anticipated by, or an obvious variation of the invention defined in a claim in the patent. *See, e.g., In re Berg*, 140 F.3d 1438, 46 USPQ2d 1226 (Fed. Cir. 1998)" (*see Id.*).

B. Independent Claims 1, 19, and 26-28

1. The Examiner Has Failed to Establish a Prima Facie Conclusion of Obviousness

The entirety of the Examiner's position, at paragraph 2 on pages 2 and 3 of the Non-Final Office Action mailed December 2, 2008, is based on the following assertion:

> Claims 1-28 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim[s] 1-49 of U.S. Patent No. 6,723,394. Although the conflicting claims are not identical, they are not patentably distinct from each other because it would have been obvious to select another well known disc shaped molecular material in place of smectic or nematic molecular material. Such would expand the applicability of the claimed method and article of US '394.

Similarly, at paragraph 2 on pages 2 and 3 of the Final Office Action mailed on August 6, 2009, the entirety of the Examiner's position is based on the following assertion:

> Claims 1-28 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-49 of U.S. Patent No. 6,723,394. Although the conflicting claims are not identical, they are not patentable distinct from each other because it would have been obvious to select another well known disc shaped molecular material in place of smectic or nematic molecular material. Such would expand the applicability of the claimed method and article.
>
> The remarks filed by applicants on May 1, 2009 have been considered but found not to be persuasive. The claims of the USP '394 are broad and inclusive of "many other types of polymer material" and arguments regarding the arrangements do not limit the teachings of this patent.

Appellant respectfully submits that the Examiner has failed to establish a *prima facie* conclusion that claim 1 is obvious over claims 1-49 of U.S. '394.

First, this is because the Examiner does not set forth and apply the factual inquiries set forth in *Graham v. John Deere Co.*, as required by MPEP § 804. Instead, at best, the Examiner's position amounts to a mere spectulatory conclusion that is not supported by any objective evidence, rationale, or analysis.

Second, the Examiner does not set forth and apply the one-way obviousness inquiry as to "whether the invention defined in a claim in the application would have been anticipated by, or an obvious variation of the invention defined in a claim in the patent."

Third, *in arguendo*, even if the Examiner's position could somehow be interpreted as detailing the one-way obviousness inquiry, the Examiner does not determine "whether the invention defined in a claim in the application would have been anticipated by, or an obvious variation of the invention ***defined in a claim*** *in the patent*." Instead, the Examiner's position is based on the assertion that "claims of the USP '394 are broad and inclusive of "many other types of polymer material" and arguments regarding the arrangements do not limit ***the teachings of this patent***." Accordingly, at best, the Examiner's position improperly alleges that claim 1 of the present application would have been obvious in view of "the teachings of [the '394] patent." Simplistic reliance upon the teachings as a whole contained in the U.S. '394 patent is insufficient to render claim 1 of the present application unpatentable on the grounds of non-statutory obviousness-type double patenting. Rather, to render claim 1 of this application unpatentable, the Examiner must rely on the specific language of claims 1-49 in the '394 patent.

Accordingly, Appellant respectfully submits that the Examiner has failed to establish a *prima facie* conclusion that claim 1, as well as its dependent claims, is obvious over claims 1-49 of U.S. '394. To the extent independent claims 19 and 26-28 are rejected by the Examiner applying the same rationale used in rejecting claim 1, Appellant respectfully submits that the

Examiner has failed to establish a *prima facie* conclusion that claims 19 and 26-28, as well their dependent claims, are obvious over claims 1-49 of U.S. '394 for at least reasons analogous to those discussed above regarding claim 1.

2. Claims 1, 19, and 26-28 Are Not Obvious Over Claims 1-49 of U.S. '394

The Examiner concedes that the presently pending claims and claims 1-49 of U.S. '394 are not identical. Appellant agrees. However, the Examiner asserts that the presently pending claims and claims 1-49 of U.S. '394 are not patentably distinct from each other. Appellant respectfully disagrees.

As shown above, in support of the rejection, the Examiner asserts that "it would have been obvious to select another well known disc shaped molecular material in place of smectic or nematic molecular material. Such would expand the applicability of the claimed method and article of US '394."

First, Appellant respectfully submits that there is no scientific theory or literature based thesis proposed for this conclusion. Rather, the Examiner's position arbitrarily presumes that "it would have been obvious to select another well known disc shaped molecular material in place of smectic or nematic molecular material."

Second, although the Examiner's double-patenting rejection makes reference to smectic or nematic molecular material, the terms "nematic" and "smectic" molecular material are not recited in claim 1 of U.S. '394, upon which the Examiner's rejection is based. In fact, claim 1 of U.S. '394 recites:

> A method for forming an electronic device having a first electrode, a second electrode and a semiconducting active layer comprising a polymer, the method comprising aligning the chains of the polymer in a plane by bringing the polymer into a liquid-crystalline phase, the first electrode and the second electrode being disposed such that when a voltage is applied across the first and

second electrodes the direction of current flow between the electrodes is in the plane.

As shown above, the scope of claim 1 U.S. '394 covers techniques applied to alignable polymer material. Many types of polymer material are covered by the claim. However, the Examiner's position improperly imports the terms "nematic" and "smectic" molecular material into in claim 1 of U.S. '394, and this improper importation is the sole basis for the Examiner's, also improper, position.

Third, there are a number of additional technical differences between the claimed "disc-shaped" molecules and smectic or nematic polymer materials.

1. Alignment

Disc-shaped molecules arrange themselves in a direction perpendicular to the disc, whereas, the direction of alignment of smectic or nematic polymer material is parallel to the polymer chain axis. The liquid crystalline phase is very different in the two cases.

2. Process and Materials

Disc-shaped molecules have very different process conditions and very different material processing steps to smectic or nematic polymer material.

3. Electronic Effect

The electronic effect achieved for disc-shaped molecules is very different to that achieved for smectic or nematic polymer material.

Accordingly, Appellant respectfully submits that it would not have been obvious to attempt to align disc-shaped molecules simply based on a structure directed to smectic or nematic polymer material.

As a result, Appellant respectfully submits that claim 1 would not have been obvious over claims 1-49 of U.S. '394. To the extent independent claims 19 and 26-28 are rejected by

the Examiner applying the same rationale used in rejecting claim 1, Appellant respectfully submits that claims 19 and 26-28, as well their dependent claims, also would not have been obvious over claims 1-49 of U.S. '394 for at least reasons analogous to those discussed above regarding claim 1.

VIII. CONCLUSION

The USPTO is directed and authorized to charge the statutory fee (37 C.F.R. §41.37(a) and 1.17(c)) and all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860
WASHINGTON OFFICE
23373
CUSTOMER NUMBER

Date: August 11, 2010

Respectfully submitted,

/ Christopher J. Bezak /

Christopher J. Bezak
Registration No. 63,241

CLAIMS APPENDIX

CLAIMS 1-28 ON APPEAL:

1. A method for forming an electronic device having a semiconducting active layer comprising a disc-shaped molecular material, the method comprising aligning columns of the disc-shaped molecules parallel to each other by bringing the disc-shaped molecular material into a liquid crystalline discotic phase.

2. A method as claimed in claim 1, wherein the device is a transistor.

3. A method as claimed in claim 1 wherein the step of bringing the disc-shaped molecular material into the liquid-crystalline phase comprises heating the disc-shaped molecular material.

4. A method as claimed in claim 3, comprising the step of quenching the disc-shaped molecular material subsequent to the said heating.

5. A method as claimed in claim 4, wherein the said quenching step is such as to form the disc-shaped molecular material into an amorphous glassy state.

6. A method as claimed in claim 1, comprising forming source and drain electrodes of the transistor in locations relative to the active layer such that the channel of the transistor is oriented parallel to the alignment direction of the columns of molecules.

7. A method as claimed in claim 1, comprising depositing the disc-shaped molecular material on top of an alignment layer capable of inducing the said alignment of the columns of molecules.

8. A method as claimed in claim 7, comprising the step of forming the alignment layer by mechanical rubbing of a substrate.

9. A method as claimed in claim 1, wherein the disc-shaped molecules are conjugated molecules.

10. A method as claimed in claim 1, comprising the step of depositing the disc-shaped molecular material from solution.

11. A method as claimed in claim 1, comprising the step of forming an active interface of the transistor by solution deposition of a dielectric polymer layer on top of the disc-shaped molecular material.

12. A method as claimed in claim 1, wherein the columns of molecules are arranged in uniaxial alignment.

13. A method as claimed in claim 1, wherein the columns of molecules are arranged in uniaxial, monodomain alignment.

14. A method as claimed in claim 1, wherein the columns of molecules are aligned in domains of local parallel alignment.

15. An electronic device formed by the method of claim 1.

16. A logic circuit comprising a transistor as claimed in claim 15.

17. A logic circuit as claimed in claim 16 including at least one optical device.

18. An active matrix display comprising a transistor as claimed in claim 15.

19. An electronic device having a semiconducting active layer comprising a disc-shaped molecular material in which columns of disc-shaped molecules have been aligned parallel to each other by bringing the disc-shaped molecular material into a liquid-crystalline phase.

20. An electronic device as claimed in claim 19, wherein the device is a transistor.

21. An electronic device as claimed in claim 19, wherein the device is a thin-film transistor.

22. An electronic device as claimed in claim 20, wherein the channel of the transistor is oriented substantially parallel to the direction of the aligned columns of molecules.

23. An electronic device as claimed in claim 19, comprising an alignment layer directly underlying the active layer.

24. An electronic device as claimed in claim 22, wherein the aligned columns of molecules are semiconducting columns of molecules.

25. An electronic device as claimed in claim 24, wherein the aligned columns of molecules are in an amorphous glassy state.

26. A method for forming an electronic device having a semiconducting active layer comprising a disc-shaped molecular material, the method comprising aligning columns of the disc-shaped molecules within domains by bringing the disc-shaped molecular material into a liquid-crystalline phase.

27. A method for forming an electronic device having a semiconducting active layer comprising a disc-shaped molecular material, the method comprising aligning columns of the disc-shaped molecules as a monodomain oriented in a preferred uniaxial direction within the layer of the electronic device by bringing the disc-shaped molecular material into a liquid-crystalline phase.

28. A transistor device comprising a disc-shaped molecular material having a discotic liquid crystalline phase.

EVIDENCE APPENDIX:

Pursuant to 37 C.F.R. § 41.37(c)(1)(ix), submitted herewith are copies of any evidence submitted pursuant to 37 C.F.R. §§ 1.130, 1.131, or 1.132 or any other evidence entered by the Examiner and relied upon by Appellant in the appeal.

NONE

RELATED PROCEEDINGS APPENDIX

Submitted herewith are copies of decisions rendered by a court or the Board in any proceeding identified above in Section II pursuant to 37 C.F.R. § 41.37(c)(1)(ii).

NONE